



Math Virtual Learning

College Prep Algebra

April 16, 2020



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Lesson: April 16, 2020

Objective/Learning Target:
How to use logarithms to solve exponential equations

Let's get started:

Have you noticed when solving algebraic equations you use inverses to “undo” the work until you are left with the solution?

Simplify and Solve

Example: $3x + 2(2x - 1) = 33$

1. Use *Distributive Property*

$$3x + 4x - 2 = 33$$

2. Combine *Like terms*

$$7x - 2 = 33$$

3. Use *Inverse Operations*

$$\begin{array}{r} + 2 \quad + 2 \\ \hline 7x = 35 \\ \hline \frac{7x}{7} = \frac{35}{7} \\ \hline \mathbf{x = 5} \end{array}$$

Lesson:

The inverse of an exponential, which means repeated multiplication, needs to be repeated division, which is what the word logarithm means!

So to solve an equation like

$$3^{x+1} = 5$$

You want to “divide repeatedly the 5 by 3” to determine the power.

$$x + 1 = \log_3 5$$

Lesson:

Watch this video that shows how to solve with logarithms.

[VIDEO](#)

The video uses an online scientific calculator. Here is the link for the calculator

[Scientific Calculator](#)

**See if you can solve the problem
from the previous slide.**

$$3^{x+1} = 5$$

$$x + 1 = \log_3 5$$

Go to the next slide to see the result!

Lesson:

Scientific Calculator

The screenshot shows a scientific calculator interface with a dark background. The display area at the top shows the calculation $\left(\frac{\log(5)}{\log(3)}\right) - 1 = 0.4649735207$. Below this, the expression $3^{\left(\frac{0.4649735207}{\text{ans}} + 1\right)} = 5$ is shown, with the value 0.4649735207 highlighted in a box and labeled 'ans'. The calculator's keypad is visible at the bottom, featuring various mathematical functions like a^2 , a^b , $|a|$, $\sqrt{\quad}$, $\sqrt[n]{\quad}$, π , \sin , \cos , \tan , and basic arithmetic operators. The mode is set to DEG.

$$3^{x+1} = 5$$

$$x + 1 = \log_3 5$$

$$\begin{array}{r} -1 \qquad \qquad -1 \\ \hline \end{array}$$

$$x = \left(\frac{\log 5}{\log 3}\right) - 1$$

$$x \approx 0.465$$

Practice:

To practice solving exponential equations with logarithms, use the worksheet link and the scientific calculator link below.

[Solving Exponential Equations with Logs AND Answer Key](#)

[Scientific Calculator](#)

Additional Practice

[Khan Academy Online Practice Problems](#)

[IXL free online practice:](#)
YOU NEED THE
CALCULATOR